



PATENT SPECIFICATION

DRAWINGS ATTACHED

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COMPLETE SPECIFICATION

Improvements in Belt Drives

We, STEPHENS BELTING COMPANY LIMITED, a British Company of, Snow Hill, Birmingham 4, in the County of Warwick, do hereby declare the invention for which we pray that a Patent may be granted to us and the method by which it is to be performed to be particularly described in and by the following statement:—

This invention relates to belt drives in which a driving belt passes around two or more pulleys and in the past driving belts can be considered as having fallen into two broad classes.

There is the class one belt known as a flat belt which has a generally rectangular cross-section, and the advantages of this form of belt are that it is light and flexible and provides a good grip and also that the use of plastics reinforcing cords, such as nylon, can provide a belt of high tensile strength with low weight. However, this form of belt suffers from the disadvantage that the belt tends to run off the pulleys at very high speeds or when sudden loads are applied, and if used with a pulley having side flanges the belt tends to ride up one or the other of the side flanges at high speed. The other class of belt is that known as a Vee belt which has a generally "V" cross-section and runs in a "V" groove in the pulley. There are also multiple Vee belts running on pulleys having a number of "V" grooves. These belts have good tracking qualities but are subject to the drawback of considerable weight and stiffness which prevents their being used at very high speeds as the centrifugal force due to the weight of the belt tends to cause it to fly off the pulley.

The object of this invention is to provide improvements to belt and pulley drives which will overcome the disadvantages of the classes of belt drive referred to above.

According to the invention we provide a belt and pulley drive wherein the operative surface of a pulley which is engaged with the belt is formed or provided within one or more portions projecting in a radially outwards direc-

tion, the or each portion being arranged so as to extend in the circumferential direction of the pulley throughout its extent, the or each projection portion being formed as a separate member which is fitted into one or more grooves extending circumferentially of the operative face of the pulley so that the or each of said members projects from its associated groove beyond the operative surface of the pulley, and the inner face of the belt which is engaged with the pulley being formed with a groove, or a corresponding number of grooves, extending longitudinally of the belt, the or each groove being of cross-section which is complementary to the cross-section of the or each corresponding projecting portion of the pulley so that the or each such portion is a running fit in the or each groove.

The invention is illustrated in the accompanying drawings wherein:—

FIGURE 1 is a view showing a section through a pulley and the corresponding belt in one embodiment of the invention.

FIGURE 2 is a fragmentary section through the rim of a pulley and corresponding belt in another embodiment of the invention.

FIGURE 3 is a fragmentary section through the rim of a pulley and corresponding belt in a further embodiment of the invention.

FIGURE 4 is a fragmentary section through the rim of a pulley in a still further embodiment of the invention.

With reference to Figure 1, there is illustrated diagrammatically, a pulley 10 upon a shaft 11 and having a thickened rim portion 12 although it will be appreciated that the actual form and shape of the pulley does not form any part of the present invention.

According to this embodiment of the invention, the rim 12 of the pulley is provided with a projecting portion in the form of a rib 19 which is located centrally of the operative surface 14 of the pulley and which extends continuously along the circumference of the rim 12.

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The rib 19 is shown as being of rectangular cross-section but it may be of any other desired cross-section some of which cross-sections are illustrated in further embodiments described hereinafter and also in certain cases, the rib 19 may be of intermittent form comprising a number of rib portions with intervening gaps.

The rib 19 is formed as a separate member such as of rubber or other suitable material strip 19 as illustrated in Figure 1, such strip 19 being fitted into a groove 20 of rectangular or other non-circular cross-section provided in the operative surface 14 of the pulley so that a portion of the strip 19 projects radially outwardly to form the projecting rib.

The belt 15 for use with the pulley illustrated in Figure 1, is of generally "flat" form and of somewhat rectangular cross-section and on its inner face, which engages the operative surface of the pulley, it is formed with a longitudinally extending groove 16 of a cross-section complementary to the rib 19 so that the rib 19 is a running fit in the groove 16.

Any generally known form of flat belt may be employed and of any suitable material. For example, the material of the main body of the belt 15 may be leather reinforced at a position close to, or on its outer surface 17 with cords 18 of a suitable material, such as nylon or other plastics material.

Alternatively, the cords may be as shown in Figure 3 with a layer of cords 22 on the surface and a layer of cords 22 a short distance below the outer surface 17, such cords 22 being, for example, of suitable plastics material such as nylon.

Figure 2 illustrates an embodiment somewhat similar to Figure 1 having the rim 12 of the pulley provided with a groove 27 in which is fitted a separate member but in this case illustrating a member such as the rubber or other material strip 26 which is of circular cross-section and which is fitted in a semi-circular groove 27 extending around the rim of the pulley. The belt 28 for co-operation with such pulley is provided on its inner face with a longitudinally extending groove 29 of semi-circular cross-section for co-operation with the projecting portion of the strip 26.

The reinforcing cords are not shown in Figure 2.

Figures 3 and 4 are examples of further cross-sectional forms which may be adopted for the rib.

In the case of Figure 3 the rib 30 is of generally oval form in cross-section whereas in Figure 4 the rib 31 is somewhat of cigar shape in cross-section and extends across the major portion of the central area of the operative surface of the pulley.

In a belt and pulley drive involving two or more pulleys of different diameters, it occurs in practice that the belt generally slips and comes off the smaller pulley at high speeds and to prevent this happening pulleys formed

in accordance with the invention will ensure tracking of the belt so that it will not come off.

In certain cases however, it is advantageous for slip to occur on one of the pulleys in the event of very high speed so as to avoid any possibility of damaging or breaking the belt and with the aid of the present invention, this may be achieved by having a different shape for the operative driving surface of one pulley as compared with the other, so arranged as to provide for slip to occur between this pulley and the belt at a predetermined speed but without any danger of the belt coming off the pulley.

Pulleys embodying the invention having a circumferentially extending groove can be formed by modern die casting or powdered metal techniques or can be suitably made from plastics material so that any desired configuration can be obtained for the operative surface of the pulley.

If desired more than one circumferentially extending rib may be provided on the pulleys of a belt drive embodying the invention, corresponding grooves being provided in the belt to accommodate the ribs and if desired the or each rib may be of undulating form.

WHAT WE CLAIM IS:—

1. A belt and pulley drive wherein the operative surface of a pulley which is engaged with the belt is formed or provided within one or more portions projecting in a radially outwards direction, the or each portion being arranged so as to extend in the circumferential direction of the pulley throughout its extent, the or each projecting portion being formed as a separate member which is fitted into one or more grooves extending circumferentially of the operative face of the pulley so that the or each of said members projects from its associated groove beyond the operative surface of the pulley, and the inner face of the belt which is engaged with the pulley, being formed with a groove, or a corresponding number of grooves, extending longitudinally of the belt, the or each groove being of cross-section which is complementary to the cross-section of the or each corresponding projecting portion of the pulley so that the or each such portion is a running fit in the or each groove.

2. A belt and pulley drive according to Claim 1, wherein the pulley has one or two projecting portions, the or each of which is in the form of a continuous rib of undulating form.

3. A belt and pulley drive substantially as described with reference to and as shown in Figure 1 of the accompanying drawings.

4. A belt and pulley drive substantially as described with reference to and as shown in Figure 2 of the accompanying drawings.

5. A belt and pulley drive substantially as described with reference to and as shown in Figure 3 of the accompanying drawings.

6. A belt and pulley drive substantially as described with reference to and as shown in Figure 4 of the accompanying drawings.

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1 SHEET

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the Original on a reduced scale

